GEOLOGY

Physiographic Region

The Sac River basin is located within the portion of the interior highlands province denoted as the Ozark plateau. It is further divided between the Springfield and Salem plateaus (MDNR 1986). The basin overlays Ordovician dolomite in the northeastern half of the basin and Mississippian limestone, shale, and sandstone in the southwestern half of the basin (MDNR 1986). The Sac River basin is divided between the Osage Plains and the Ozarks natural divisions (Figure 7). The western edge of the basin is part of the Osage Plains natural division. The rest of the basin is located primarily in the Springfield Plateau with a small section in the Upper Ozarks area (Thom and Wilson 1980).

Geology and Soils

The uplands in the Sac River basin are mantled with a thin layer of loess ranging from less than two feet thick in the headwaters areas to about four feet in thickness in the lower portions of the basin. The headwaters originate on Mississippian aged limestones and dissect progressively younger strata going downstream. Ordovician dolomites and thin layers of shale are also incised progressing downstream. The lower Sac River ends up incising Pennsylvanian aged shale in the area of its confluence with the Osage River/Truman Reservoir. Figure 8 shows the geology of the Sac River basin.

Karst areas are found in the Sons Creek sub-basin, along the Sac River upstream of Stockton Reservoir, and throughout the portion of the basin found in Greene County (MDNR 1986). Caves, sinkholes, springs, and other natural features related to Karst terrain are most numerous in the southeastern section of the basin and become progressively less numerous to the northwest (MDNR 1986). Figure 9 shows the location of named springs.

Coal deposits underlay the far northwestern portion of the basin (MDNR 1986).

The Sac River basin drains a diverse landscape through a variety of tributaries. The watershed soils will be broken down based on the nine major tributary systems. Soil associations and descriptions follow Allgood and Persinger (1979) as Cedar, Dade, and Polk counties, which comprise the majority of the watershed, do not have completed soil surveys available.

Turnback Creek watershed originates in Bolivar-Hector upland association soils. It then flows through Peridge-Wilderness-Goss-Pembroke and Nixa-Clarksville soil associations. The lower reaches flow through the Hartville-Ashton-Cedargap-Nolin bottomland soil association.

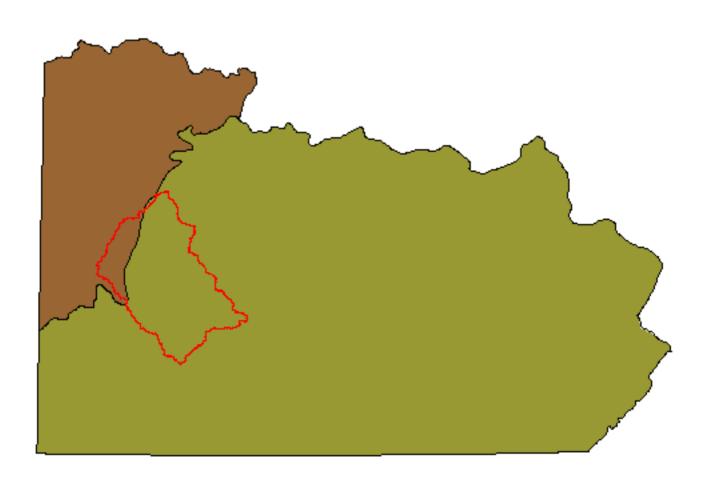
Limestone Creek watershed originates in Parsons-Creldon upland soil association. It then flows through Gerald-Creldon-Hoberg-Keeno and Viraton-Wilderness association soils to its confluence with Turnback Creek.

Sons Creek watershed originates in the Parsons-Creldon upland soil association and flows through Gerald-Creldon-Hoberg-Keeno association soils until it is inundated by Stockton Reservoir.

The Little Sac watershed originates in Eldon-Pembroke, Peridge-Wilderness-Goss-Pembroke, and Needleye-Viraton-Wilderness soil associations. It then flows through Peridge-Wilderness-Goss-Pembroke soils. The lower reach flows through Hartville-Ashton-Cedargap-Nolin bottomland soils until it is innundated by Stockton Reservoir. Two

GE 01

Figure 7. Natural divisions of the Sac River basin.

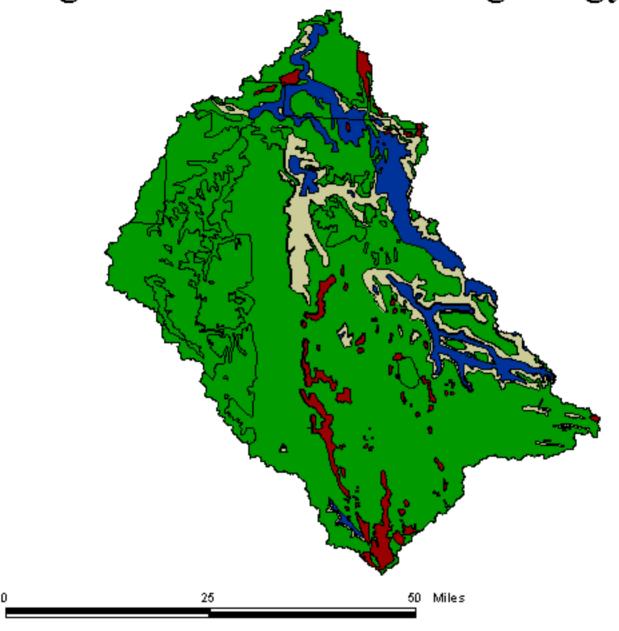




- Sac River Basin
- Ozark Natural Division
- Osage Plains Natural Division



Figure 8. Sac River basin geology.



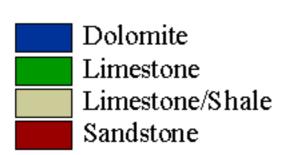
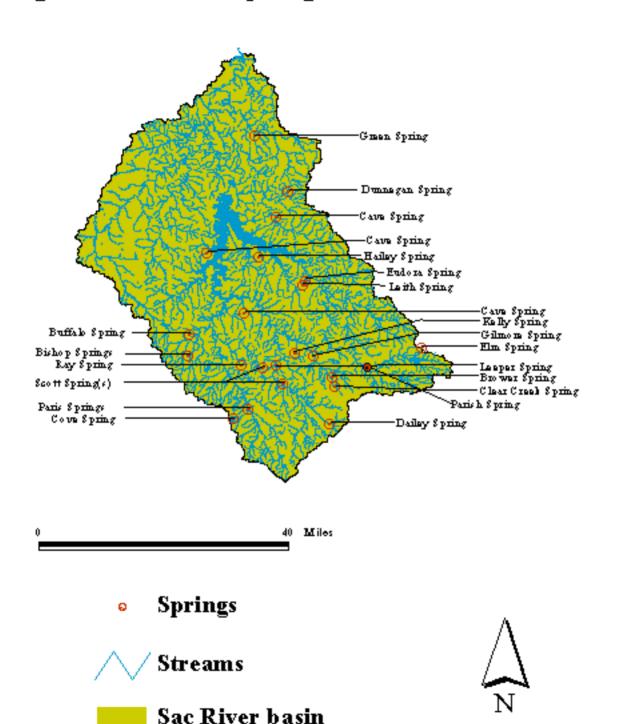




Figure 9. Named springs in the Sac River basin.



impoundments near the headwaters of the Little Sac watershed (Fellows Lake and McDaniel Lake) cause a rapid descent to Hartville-Ashton-Cedargap-Nolin bottomland soils.

Bear Creek originates in Eldon-Pembroke and Peridge-Wilderness-Goss-Pembroke soil associations. Most of the mid-section flows through Peridge-Wilderness-Goss-Pembroke association soils but the uplands near the mouth become Bolivar-Hector association soils. The bottomland soil association is once again Hartville-Ashton-Cedargap-Nolin for a short distance before Bear Creek flows into the Sac River.

Brush Creek originates and flows through Gerald-Creldon-Hoberg-Keeno association soils. Bottomland soils are of the Hartville-Ashton-Cedargap-Nolin association.

Turkey Creek headwaters originate in Bolivar-Hector association soils and the stream flows through Peridge-Wilderness-Goss-Pembroke soils to its confluence with the Sac River.

Coon Creek headwaters originate in Viraton-Wilderness soils and flows through Hartville-Ashton-Cedargap-Nolin bottomland soils to the stream's confluence with the Sac River.

The Cedar Creek - Horse Creek - Alder Creek watershed originates in Parsons-Barden and Liberal-Barco-Collinsville soil associations. They then flow through Bolivar-Hector, Hepler-Radley-Verdigris-Osage, and Gerald-Creldon-Hoberg-Keeno association soils. Bottomland soils are of the Hartville-Ashton-Cedargap-Nolin association to the watershed's confluence with the Sac River.

The Sac River originates in Viraton-Wilderness and Eldon-Pembroke Upland soils associations. It then flows through Gerald-Creldon-Hoberg-Keeno and Peridge-Wilderness-Goss-Pembroke soil associations. The middle section of the river is inundated by Stockton Reservoir. Uplands near the lower portions of the Sac River are Bolivar-Hector association soils, grading to Gerald-Creldon-Hoberg-Keeno and Peridge-Wilderness-Goss-Pembroke soil associations, with bottomland soils of the Hartville-Ashton-Cedargap-Nolin association. The variety of soil associations found in the Sac River basin is because it is in the transition area between natural divisions. It exhibits characteristics found in the Osage Plains, Ozarks, and Ozark Border natural divisions.

Watershed Area

The Sac River basin encompasses 1,981 square miles in southwest Missouri. The Sac River basin headwaters begin in, and west of the Springfield metropolitan complex and flow northward to their terminus in Truman Reservoir. Stockton Reservoir is a 24,900-acre reservoir in the heart of the basin that inundates large sections of the Sac and Little Sac rivers.

Channel Gradient

The Sac River originates in northwestern Christian County and flows northward until it terminates as a sixth order tributary of the West Osage River in Truman Reservoir. Gradients in the Sac River basin are generally 5 to 10 feet/mile (Barnett et al 1985). Gradients in headwater reaches of the Sac River basin can exceed 40 feet/mile. Elevation ranges from 1,250 feet above mean sea level (msl) near the headwaters to 690 feet msl at the mouth (Barnett et al 1985). Gradient information for streams and rivers third order and larger in the Sac River basin are available from the Missouri Department of Conservation's Southwest Regional Office in Springfield, Missouri.